

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A system for measuring a plasma electron density in a plasma chamber, the system comprising:

a plasma chamber containing a plasma;

a frequency source ~~[(a)]~~ for providing a ~~decreasing frequency~~ signal to the plasma chamber ~~and (b) for providing such that the signal sweeps in decreasing frequency direction and then sweeps in an increasing frequency to the plasma chamber after providing the decreasing frequency direction;~~

a resonance frequency detector ~~(a)~~ for detecting a first set of resonance frequencies excited by the decreasing frequency sweep and ~~(b)~~ detecting a second set of resonance frequencies excited by the increasing frequency sweep;

a comparator for determining a difference between a number of frequencies in the first and second sets;

a fringe order calculator for determining a fringe order of the plasma; and

a density calculator for determining a plasma electron density of the plasma based on the fringe order.

Claim 2 (Original): The system according to claim 1, wherein the frequency source comprises a voltage-controlled microwave oscillator.

Claim 3 (Original): The system according to claim 2, wherein the frequency source further comprises a digital-to-analog convertor for applying a voltage to the voltage-controlled microwave oscillator.

Claim 4 (Original): The system according to claim 1, wherein the plasma chamber comprises an open resonator immersed in a plasma.

Claim 5 (Original): The system according to claim 4, wherein the open resonator comprises plural reflectors, wherein all input and output connections are made to only one of the plural reflectors.

Claim 6 (Original): The system according to claim 1, further comprising a data input device for entering a desired plasma electron density.

Claim 7 (Original): The system according to claim 6, further comprising:  
a plasma generator; and  
an automatic controller for controlling the plasma generator to produce the desired plasma electron density based on the density calculated by the density calculator.

Claim 8 (Currently Amended): A method for measuring a plasma electron density in a plasma chamber, the method comprising the steps of:

(a) ~~providing~~ sweeping a signal output from a frequency source in a decreasing frequency direction and providing the decreasing frequency sweep signal to the plasma chamber ~~via a frequency source~~;

(b) ~~providing, via~~ sweeping the signal of the frequency source in an increasing frequency direction and providing the increasing frequency sweep signal to the plasma chamber after providing the decreasing frequency sweep signal;

(c) detecting, via a resonance frequency detector, a first set of resonance frequencies excited by the decreasing frequency sweep;

(d) detecting, via the resonance frequency detector, a second set of resonance frequencies excited by the increasing frequency sweep;

(e) determining a difference between a number of frequencies in the first and second sets;

(f) calculating a fringe order of the plasma; and

(g) determining a plasma electron density of the plasma based on the fringe order.

Claim 9 (Original): The method according to claim 8, wherein the steps (a) and (b) comprise providing frequencies via a voltage-controlled microwave oscillator.

Claim 10 (Original): The method according to claim 8, wherein the steps (a) and (b) comprise providing frequencies to an open resonator immersed in a plasma.

Claim 11 (Original): The method according to claim 10, wherein the steps (c) and (d) comprise detecting from plural reflectors, wherein all input and output connections are made to only one of the plural reflectors.

Claim 12 (Original): The method according to claim 8, further comprising the step of inputting a desired plasma electron density.

Claim 13 (Original): The method according to claim 12, further comprising the steps of:

generating a plasma in a plasma generator; and

controlling the plasma generator to produce the desired plasma electron density based on the density calculated by the density calculator.

IN THE DRAWINGS

The attached drawing sheet includes changes to Figure 2. This drawing sheet, which includes Figure 2, replaces the original drawing sheet including Figure 2.

Attachment: Replacement Sheet